

THURSDAY, OCTOBER 22, 1908.

INDUSTRIAL HYGIENE.

Diseases of Occupation: From the Legislative, Social, and Medical Points of View. By Dr. Thomas Oliver. Pp. xix+427. (London: Methuen and Co., n.d.) Price 10s. 6d. net.

THE present work deals with one of the most attractive branches of preventive medicine. It is the time of legislative interference between employers and workmen, and at no time has the health of the community been held in higher regard. If the regulation of the health of workpeople is to be effected in that practical manner which has always distinguished the progress of sanitary science in this country, it is urgently necessary that those in whose hands such regulation lies should be more thoroughly conversant with the medical side of the problem.

In a comparatively small book Dr. Oliver has succeeded in bringing together a vast amount of useful information on all sorts of subjects, ranging from mining to mountain sickness and from anthrax to the alkali manufacture. The most important section, occupying nearly one-fifth of the book, is that dealing with lead poisoning, in the suppression of which in this country Dr. Oliver has played so prominent a part. Very full treatment is also given to the effects of organic and inorganic dust, a matter which has to be considered in reference to a great variety of trades. Ankylostomiasis is dealt with in detail in the light of the author's own researches, and there is a long, though not altogether satisfactory, chapter on mining.

We do not find, however, any adequate discussion of several problems which concern nearly all trades alike—the question of the temperature of factories, &c., for example—and it is certainly time that someone undertook seriously the discussion of the influence of slightly vitiated atmospheres on the health of workfolk. The subject is throughout treated almost entirely from the point of view of the medical man and the pathologist. It is to be regretted that the actual manufacturing processes are not given more fully. A proper understanding of these is necessary both for the consideration of the scientific questions involved and to enable the medical man to adjust in some part his idealism to the needs of practical life. The solution of the difficulties presented by trade diseases must at any rate begin by some sort of compromise between the manufacturer and the doctor.

Such pleasant reading do Dr. Oliver's chapters make that one may not realise at the moment that the information one has absorbed is of a peculiarly elusive kind. The facts with which he has dealt are not drawn up in any very orderly array, and throughout one finds a certain vagueness which may well tend to make the reader feel that he is treading on ground too uncertain to bear definite action. Our knowledge of industrial hygiene is sadly defective, but the general principles which must underlie preventive measures are in many cases already suffi-

ciently well assured to bear definite enunciation. We do not suppose, for example, that Dr. Oliver really believes that there is any multiplication of individuals in *Ankylostoma* outside the human body; yet he leaves this absolutely fundamental question vaguely unsettled. To laymen who are not acquainted with details, and therefore not in a position to form their own conclusions, this must be very unsatisfactory.

In some places where definite directions are given they are contradictory; thus in the chapter on rescue apparatus for use in mines we find (p. 406):—"Any person attempting to do rescue work should therefore be provided with not less than 1 cubic foot of oxygen per hour"—i.e. less than half a litre per minute, an altogether inadequate amount—and later (p. 408):—"A man about to undertake rescue work should be given a continuous supply of 2 litres of oxygen per minute." Written by a scientific man in part at least for the use of the "general reader," we should expect to find evidence that the scientific data were stated with particular care. Yet without looking beyond the same section (p. 407) we find that "liquid air contains 2 parts of oxygen to 1 part of nitrogen," the proportions, of course, being subject to considerable variation, and "in respiration only 4 per cent. of the oxygen inhaled is taken up by the blood," instead of about 20 per cent.

The chapter on compressed-air and caisson disease is perhaps the least satisfactory. The author appears to accept the "soda-water-bottle theory," but he dallies so long with the notions that a small excess of carbonic acid in the air, mechanical repletion of the visceral veins, and frictional electricity are important factors that one is almost compelled to agree that "there is still much to learn as regards the causes of caisson disease." As a matter of fact, the work of Paul Bert, Leonard Hill and others leaves no reasonable room for doubt that the "soda-water-bottle theory" is correct. To encourage any longer the theory of Snell that carbonic acid has any material influence in practice is to stimulate local authorities to waste huge sums of money upon extravagant ventilation of caissons.

The recommendations for the prevention of caisson disease are not only indefinite, but also very unsound. Dr. Oliver considers 3 or 5 minutes per atmosphere of pressure as a safe time to allow for decompression, and quotes the experience at the Bakerloo tunnel that the cases of illness were not diminished by extending the time of decompression from $1\frac{3}{4}$ to $6\frac{1}{4}$ minutes. The truth is that all these times are so much too short that one is not likely to be much better than another; some 30 to 60 minutes are required for real safety. Dr. Oliver commends, but fortunately does not detail, the Dutch regulations; these, in fact, prescribe that the rate of decompression should become quicker as the pressure falls, a procedure which, if applied to decompression from high pressures, would without doubt kill many people. In the pages devoted to diving, he states that divers should descend slowly; he does not explain why, perhaps because there is no reason except that a slow descent increases the risk.

The whole subject of trade diseases is in fact too large and too complicated to be handled by a single author, and it cannot be dealt with in generalities. The facts are difficult to come by and hard to interpret, yet it is upon accurate detail alone that preventive measures, involving as they may do such large interests, may with propriety be undertaken. Dr. Oliver has provided a very pleasant introduction to the subject, which should at any rate tend to promote cordial relations with his Continental confreres.

A. E. B.

SCIENTIFIC EXPLORATION IN DAHOMEY.

Mission scientifique au Dahomey. By Henry Hubert. Pp. iv+568. (Paris: E. Larose, 1908.) Price 15 francs.

IN this work M. Hubert gives a very detailed description of the results of his various journeys in Dahomey, dealing principally with the meteorology, the action of surface waters and of the sea, and the geology. The volume is accompanied by an admirable geological map on the scale of 1:1,250,000, giving the broad structural features of the colony as far as Sansan-Haoussa, on the Niger, in approximately 14° N. lat. It is, of course, idle to expect entirely satisfactory conclusions at a comparatively early stage of investigation, but there is every reason to congratulate M. Hubert on the volume he has produced, on which much time and care have been lavished, and which constitutes a great advance in our knowledge of West African geology. M. Hubert mentions at the outset the characteristics well known to geologists on that coast, of a general simplicity of the main features, a complication in detail and a woeful scarcity of fossils.

As was already known, crystalline rocks occupy by far the greater part of Dahomey, and the coarse granitoid gneisses, banded gneisses, mica- and hornblende-schists, granites and pegmatites do not greatly differ from those of Kamerun and southern Nigeria.

Amongst the less common rock-types described may be mentioned an alkali-granite containing riebeckite, recalling the similar rocks described from Zinder and south of Chad; and some cipolins from the bed of the Zon (Savaloo region), associated at Zompa with a scapolite-hornblende-gneiss. In a somewhat brief account of the petrography these cipolins are described as containing diopside, forsterite and calcite, the first and second occasionally altered into antigorite.

Omitting for a moment the recent beds, M. Hubert finds the continuity of this great stretch of crystalline rocks is broken twice; first by the quartzites of the Atacora ridge, and secondly by the grits of the Gourma. The Atacora range traverses the colony obliquely from Kirtachi, on the Niger, to about the tenth parallel; and is, in M. Hubert's opinion, a prolongation of the northern and southern range, forming the central part of Togo Land, which twists south-westwards to reach the sea at Accra.

Additional information concerning the relations of

the Atacora quartzites to the underlying gneiss and mica-schists would have been welcome, and we may incidentally remark that the word quartzite is used throughout the book for somewhat dissimilar rocks. The Atacora quartzites are probably quartz-schists, and when disturbed (they are generally horizontal) are folded with the underlying rocks. On very slender evidence M. Hubert provisionally maps these rocks as Silurian.

The Gourma grits occupy a tract of country much smaller than, but mapped as essentially parallel to, the Atacora range. The rocks extend from Kodjar to a point more than 100 kilometres south-westwards. These Gourma grits are surrounded by crystalline rocks, noteworthy for the abundance of basic types both amongst the schists and the eruptive series. In regard to age M. Hubert places these grits between the Atacora quartzites and the far more recent beds of the Niger basin, considering them nearer to the former than to the latter.

It is interesting to note the resemblance they bear to the Bandiagara and Hombori beds recorded by M. Desplanges.

Between the Gourma grits and the alluvium, "terre de barre," and other deposits now in process of formation, two areas are noteworthy as containing comparatively recent beds, and as helping towards a reconstruction of West African geography in late Cretaceous and Tertiary times. These are the grits of the Niger basin and the calcareous beds of Lama, which form a narrow strip crossing the colony obliquely to the south of Abomey in 7° N. lat. The ages of these deposits are not definitely fixed; the Niger beds are unfortunately unfossiliferous, and the fossils of the Lama region are not sufficiently characteristic to allow the Eocene age, suggested for them, absolutely to be proved. The identification is based on the occurrence of a *Turritella*, near to *T. eschi*, which in Kamerun is associated with undoubted Eocene fossils, and on the occurrence of *Dactylopora cylindracea*, Lamk. A photograph of a specimen of the shelly limestone and the general habit of the beds recalls the (? Upper) Cretaceous beds of the eastern province of southern Nigeria, and it appears at least possible that future investigation may show the Dahomey rocks to be rather older than was at first believed.

The very interesting question of the age of the Niger grits has to be left entirely open. They form the plateau on either side of the river between Sansan-Haoussa and Gaya, and have been cut through by the Niger, which thus exposes the crystalline rocks beneath. M. Hubert notices these beds as occurring as far south as Sakassi, in northern Nigeria, and somewhat similar rocks occur on the Jebba-Lokoja section of the river. Is it possible that these beds also are of Cretaceous age?

Nearly one-third of the book is devoted to a discussion of the meteorology and the action of superficial waters, while a few short chapters are concerned with the distribution of animal and vegetable types. Distribution of races as determined by geographical conditions greatly interests M. Hubert, and